Developing a web application to improve communication at a software company.

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

EU	European Union (Abbreviation)

LIST OF FIGURES

No table of figures entries found.

LIST OF TABLES

No table of figures entries found.

Chapter 4: Data Gathering and Analysis

1. Introduction

The goal of this study is to develop a web application that can be used to enhance communication between developers and management at a South African software development company. As discussed in Chapter 2, this study follows the Vijay Vaishnavi (2004) process model, this chapter will focus on the "Suggestion" phase. The artefact needs to be built according to what the end user expects, this phase of the study is there to define the requirements properly and do an analysis on what is intended for the artefact (Softwaretestinghelp, 2021).

According to Valenzuela and Shrivastava (2002) the reason behind conducting an interview is to get a better understanding and insight on how to design the artefact. An interview was done with an experienced project manager from the industry, as part of the analysis that is required to design the artefact. The data analysis technique that was used for this study is open coding. Open coding is the first step in gradually making sense of data, the technique to open coding is to go through the data collected line-by-line and generate as many codes as possible and ultimately putting everything together (Utsc, 2020).

This chapter will firstly give background of the participant, followed by the interview questions. The section that follows will provide the feedback from the interview. An analysis of the feedback obtained is discussed in the section that follows. The chapter will end with a conclusion.

2. Problem description and background

In the corporate world, businesses rely on effective communication to succeed. Developers use their screens to communicate and to develop, it often happens that developers lack the number of screens that they need to keep all their important tabs open. This makes it harder for important messages to reach developers and influences productivity and creativity (Schrader, 2018).

As a solution, an artefact has to be developed to assist with the effectiveness of communication in the industry.

3. Aims and objectives of project

This study proposes the development of a communication web application that can easily be viewed in an office by all employees to allow easy access to important communication regarding specific software development projects. Where the primary objective is to develop a web application for a South African software development company that allows for easy access to important communication relating to specific project.

The type of interview used for this study is a semi-structured interview. A semi-structured interview is a combination between an unstructured interview and a structure interview, a researcher will ask questions from a list of questions, but after receiving the answer continue to have a deeper and more in detail conversation with the respondent (Bhasin, 2019). The interview was done in person and notes were made during the interview and is discussed later in the chapter.

After the interview open coding will be used as a data analysis technique to sort out important points and group them together (Utsc, 2020). By grouping the points together, you answer the following questions: "What is the respondent trying to say?", "What does it mean?" and "How is it said?". Open coding is used to extract the most important information out of the gathered data (Khandkar, 2009).

4. Data Analysis

According to Seers (2012) qualitative research uses a rigorous and systematic approach to answer questions on what people feel or think about something. This can address why something is what it is, or why something happened. Qualitative data takes the form of text or words, for example an interview.

Qualitative data analysis is making sense of the data gathered from the interview that was conducted (Caudle, 2004). The Analysis makes important information to the study clearer.

4.2. Participant

The participant that is was selected to participate is a specialist in project management and has experience in working in the industry. The feedback that is going to be obtained will benefit towards the design and layout of the artefact, as the participant has developed, designed, and managed various artefacts that are similar in the ways of client's expectations and needs. This participant was selected because their daily tasks include streamlining communication across their team, which contribute towards achieving the goal of this study. Furthermore, as project managers are superior in understanding an artefact as a whole, focusing on quality, cost and schedule, this feedback will contribute towards the design and development of the artefact (DiStasi, 2020).

4.3. Interview Questions

Table 4.1 below contains interview questions that was asked in order to gather the necessary data needed for analysis. Different sources were used to set up the needed questions.

Table 4.3.1: Interview questions

Number	**Question**
1.	What is the overall purpose of the artefact? (McNamara, 2019)
2.	What problem will be solved by the Software? (Tripathi, 2017)
3.	Are there other products or tools that we can, should, or need to integrate with? (Brockett, 2020)
4.	What features are most important to the target audience? (Tripathi, 2017)
5.	What value are we providing to users? (Brockett, 2020)
6.	What does success look like at each stage of the process? (Kumulos, 2015)
7.	What is the underlying assumptions? (Kumulos, 2015)

The questions in table 4.1 are the basic questions that are asked in such an interview, the last question is there to get information on what happens after the study. These questions need to be adapted to fulfil the purpose of the study and for the data analysis to be as accurate as possible. The questions that was adapted are shown in the table below, as well as why the question were asked for this study.

Table 4.3.2: Adapted interview questions

Number	Question from source	Question adapted for the study	Why this question?
1.	What is the overall purpose of the artefact? (McNamara, 2019)	What should the web application regarding communication accomplish at a software company?	This question will ensure that the artefact will indeed solve the problem of this study.
2.	What problem will be solved by the software? (Tripathi, 2017)	What problems will the web application solve at a software company?	This question will give feedback on how successful the artefact will be.
3.	Are there other products or tools that we can, should, or need to integrate with? (Brockett, 2020)	What other products or tools can, should, or need to integrate into the web application?	One of the goals of the study was to collect data on existing applications and adapt accordingly.
4.	What features are most important to the target audience? (Tripathi, 2017)	What features are the most important to add in the web application to improve communication?	This question will give feedback on what features are crucial to the

			artefact's success.
5.	What value are we providing to users? (Brockett, 2020)	What value are we adding to the company?	This question will give feedback on if the company will benefit from using the artefact.
6.	What does success look like at each stage of the process? (Kumulos, 2015)	At each stage of development, what do you see as success?	This question will give feedback on what the users expect at the end of the artefact.
7.	What is the underlying assumptions? (Kumulos, 2015)	What are the underlying assumptions when developing the web application?	This question will give feedback on how to approach the development.

The feedback from the interview will be represented in the next section of the study.

4.4. Interview response

4.4.1. What should the web application regarding communication accomplish at a software company?

- The web application should enhance the communication between management and developers at the company, the web application should be able to assist in the effectiveness of communication.
- It should be easy enough to access important information regarding communication between employees, the artefact should focus on user friendliness.

- The web application has to let the developers know when the plans of the project has changed. The web application needs to keep up, and constantly be updated by the project manager of developer.
- The web application should send notifications to remind you of something important.
- In general, it should feel that you put less effort into communicating with your employees and put more effort into working on your project.

4.4.2. What problems will the web application solve at a software company?

- Make it easier for important messages to reach the team, including project manager and developers.
- Making developers more productive and creative as they do not have to look at their phones periodically.
- Project managers have more freedom and can handle more than one project with ease.
- Developers have less tabs open while they work, as only one is needed and they can switch between programs easier.

4.4.3. What other products or tools can, should, or need to integrate into the web application?

- As the company is already using Slack as their main communication application, it should be integrated into the web application in a way.
- WhatsApp is also an application that is generally used to communicate when employees are not at their computers, especially after hours.
- Discord is a good Voice over Internet Protocol and can be very useful when having brief meetings.

- Trello can be used to organize the companies sprints and communicate on how each project is doing.

4.4.4. What features are the most important to add in the web application to improve communication?

- Issue queues, to exchange information about development, to give feedback as a project manager and developer.
- Use existing or create a chat system, such as Slack, Discord or WhatsApp.
- There should also be a calendar, to make it easier to organize meetings between employees and have a general idea of what is going on in the company.
- There should be a way for everyone to see with what other employees are busy with, and if they are too busy to talk to.
- A dashboard to see only the most important information at first glance.

4.4.5. What value are we adding to the company?

- Not immediately interrupting an employee, but still notify that something important is waiting for their attention.
- Create a more relaxed environment, while still maintaining order in the company.
- Easy access to the desired communication in the company and less miscommunication.
- More effective communication between employees, this leads to less time wasted, better quality of work and more money being made.

4.4.6. At each stage of development, what do you see as success?

- As a user, the end product is important. It should be bug free, easy to use and learn. It should also look formal.

- As a project manager, each sprint should be finished on time, bugs should be to a minimum. If this is not achieved, a different approach should be taken to improve on the quality of the project.

- Propper testing should be in place, this should include unit testing and user acceptance testing.

- At the end documentation should be in place for users.

4.4.7. What are the underlying assumptions when developing the web application?

- The users' experience is always first, and the changes should be made to benefit them.

- There should always be a preview of the work that has been done, this will happen after each sprint.

- It is sometimes better to use an off the shelf product than to make your own, it is usually cheaper.

- Do not waste time or money on creating functionality that do not benefit your project.

4.5. Analysis of data obtained from data Analysis

The data analysis technique that was used for this study is open coding, more specifically line-by-line coding, which is analysing the data line by line (Khandkar, 2009). Open coding is the qualitative data analysis technique for creating categories that order data according to their similarities and differences Khandkar (2009). Line-by-line coding is important for building different concepts out of a small-scale data set, making it perfect for this study.

When the analysis of the qualitative data was done, meaning units were extracted from the transcribed interview texts, then condensed into smaller meaning units, this relates to an assigned code and form part of the category. Each question was broken up into

meaning units and examples of the interviewee response was given of that meaning unit.

Feedback obtained for question 1 is analysed in table 4.5.1 below.

Table 4.5.1: Question 1 feedback

1. What should the web application regarding communication accomplish at a software company?	
Meaning unit	**Interviewee response**
Improve communication	"The web application should enhance the communication between management and developers at the company"
	"It should feel that you put less effort into communicating with your employees."
Update user about important information	"The web application has to let us know when the plans of the project has changed."
	"The web application should send notifications to remind you of something important."

As seen in Table 4.5.1 above, the artefact should focus on improving communication while putting less effort into communicating with employees. The user should also be getting updates on important information on an efficient manner.

The feedback obtained for question 2 is analysed in table 4.5.2 below.

Table 4.5.2: Question 2 feedback

2. What problems will the web application solve at a software company?	
Meaning unit	**Interviewee response**

More productivity	"Making developers more productive and creative as they do not have to look at their phones periodically."
	"Project managers have more freedom and can handle more than one project with ease."
More flexibility	"Make it easier for important messages to reach the team, including project manager and developers."
	"Developers have less tabs open while they work, as only one is needed and they can switch between programs easier"

As seen in Table 4.5.2 above, while using the artefact the users should be more productive and have more flexibility as they will not have so many tabs open at a time.

The feedback obtained for question 3 is analysed in table 4.5.3 below.

Table 4.5.3: Question 3 feedback

3. What other products or tools can, should, or need to integrate into the web application?	
Meaning unit	**Interviewee response**
Text messages	"As the company is already using Slack as their main communication application"
	"WhatsApp is also an application that is generally used to communicate when employees are not at their computers"
Project related	"Discord is a good Voice over Internet

	Protocol"
	"Trello can be used to organize the companies sprints and communicate on how each project is doing"

As seen in Table 4.5.3 above, the artefact should focus not only on communication between employees, but also focus on communicating the project details to the user.

The feedback obtained for question 4 is analysed in table 4.5.4 below.

Table 4.5.4: Question 4 feedback

4. What features are the most important to add in the web application to improve communication?	
Meaning unit	**Interviewee response**
Quick review	"There should also be a calendar, to make it easier to organize meetings between employees and have a general idea of what is going on in the company."
	"There should be a way for everyone to see with what other employees are busy with, and if they are too busy to talk to."
Development related	"Issue queues, to exchange information about development, to give feedback as a project manager and developer"
	"There should also be a calendar, to make it easier to organize meetings between employees and have a general idea of

	what is going on in the company."

As seen in Table 4.5.4 above, the artefact should be designed to have a quick way of viewing important information, for example a calendar feature and a way to view all employees to see if they are busy. The artefact should also focus on features that benefit the project that they are working on, for example issue queues.

The feedback obtained for question 5 is analysed in table 4.5.5 below.

Table 4.5.5: Question 5 feedback

5. What value are we adding to the company?	
Meaning unit	**Interviewee response**
Relaxed environment	"Not immediately interrupting an employee, but still notify that something important is waiting for their attention."
	"Create a more relaxed environment, while still maintaining order in the company."
Less miscommunication	"Easy access to the desired communication in the company and less miscommunication."
	"More effective communication between employees, this leads to less time wasted, better quality of work and more money being made."

As seen in Table 4.5.5 above, the two most important values that the artefact will bring into the company is creating a more relaxed environment while creating less miscommunication between employees.

The feedback obtained for question 6 is analysed in table 4.5.6 below.

Table 4.5.6: Question 6 feedback

6. At each stage of development, what do you see as success?	
Meaning unit	**Interviewee response**
User Experience	"As a user, the end product is important."
	"At the end documentation should be in place for users."
Project integrity	"Propper testing should be in place, this should include unit testing and user acceptance testing."
	"Each sprint should be finished on time, bugs should be to a minimum"

As seen in Table 4.5.4 above, success is having a user that is satisfied with the artefact, as well as having documentation for the user to follow. Having a project that is bug free while finishing on time is also seen as a success.

The feedback obtained for question 7 is analysed in table 4.5.7 below.

Table 4.5.7: Question 7 feedback

7. What are the underlying assumptions when developing the web application?	
Meaning unit	**Interviewee response**
Users first	The users' experience is always first, and the changes should be made to benefit them.

	There should always be a preview of the work that has been done, this will happen after each sprint.
Resource management	It is sometimes better to use an off the shelf product than to make your own, it is usually cheaper.
	Do not waste time or money on creating functionality that do not benefit your project.

As seen in Table 4.5.4 above, the two common underlying assumptions are putting the user first and making sure that they get what they want while spending the right amount of resources to achieve the end goal.

4.6. Report on findings

After the data analysis the most important requirements and specifications was identified and is shown in Table 5.1 below.

Table 5.1: Most important requirements and specifications

Most important requirements and specifications	
Number	**Requirement or specification**
1.	Improve communication.
2.	Improved productivity.
3.	Artefact should focus on communication between employees and communication about the project.
4.	Create a relaxed environment.

5.	The user experience comes first.

As shown in Table 5.1 above, the conclusion is that the artefact should improve both communication and productivity in the company. The artefact should focus not only on communication between employees, but also communicate the information about the project. The artefact should create a more relaxed environment in the company, while making it easier for the users to interact with the communication aspect that is required in the industry.

5. Conclusion

Qualitative data analysis is making sense of the data gathered from the interview that was conducted (Caudle, 2004). The Analysis makes important information to the study clearer.

The participant that was interviewed in this study is a specialist in project management and has experience in working in the industry. The feedback that was obtained benefited the design and layout of the artefact.

The data analysis technique that was used for this study is open coding, more specifically line-by-line coding, which is analysing the data line by line (Khandkar, 2009). Open coding is the qualitative data analysis technique for creating categories that order data according to their similarities and differences Khandkar (2009).

After the data analysis the most important requirements and specifications was identified and is shown. The conclusion is that the artefact should improve both communication and productivity in the company.

In the next chapter the artefact is designed and developed according to the finding of the data analysis.

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